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LOTTERY TICKET TERMINAL WITH FRICTION HINGE ASSEMBLY

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FRICTION HINGE ASSEMBLY AND DISPLAY TILT DEVICE

BACKGROUND INFORMATION

[002] Friction hinges are often used to hold a joint in a particular position, or to slow or restrict the movement of one part of a hinged structure relative to another part. For example, friction hinges may be used to hold open cabinet doors or hold the monitor portion of a laptop computer in an upright position. Conventionally, friction hinges are constructed such that a torque exists between two objects or between two parts of a single object, having an axis of rotation in common. In conventional devices, the friction hinge is applied at the pivot, or the joint, of the two parts.

BRIEF DESCRIPTION OF THE DRAWINGS

[003] Figure 1 illustrates an example conventional friction hinge.

[004] Figure 2 illustrates example linkage arms of a friction hinge assembly, according to an example embodiment of the present invention.

[005] Figure 3 illustrates an example display tilt mechanism having two friction hinge assemblies, according to an example embodiment of the present invention.

[006] Figure 4 illustrates an example lottery ticket terminal, according to an example embodiment of the present invention.

[007] Figure 5 illustrates the example lottery ticket terminal of Fig. 4, with the monitor in a raised position, according to an example embodiment of the present invention.

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS

[008] Figure 1 illustrates an example conventional friction hinge. Part 102 is connected to part 104 via friction hinge 106. The dashed line indicates the placement of part 104 after having been moved to another position. It may be appreciated that the friction hinge is applied at the pivot 108 between the two parts.

[009] Figure 2 illustrates example linkage arms of a friction hinge assembly, according to an example embodiment of the present invention. A left linkage arm 202 and a right linkage arm 204 are shown. Both of the linkage arms include a top segment 210 and a bottom segment 212. The top segment 210 and bottom segment 212 are joined at a pivot point 206. The top segment 210 and bottom segment 212 are joined by friction hinge 208, which may be a conventional friction hinge. The top and bottom segments, 210, 212 may be joined to the friction hinge by screws or pins using holes already provided in the hinge. For example, a low profile pre-manufactured friction hinge may be used, where the top segment 210 and bottom segment 212 are attached to each of the two retainers 216 extending radially from the center of the hinge. It may be appreciated that in some instances a single linkage arm may be used, or more than two linkage arms may be used.

[010] Figure 3 illustrates an example display tilt device having two friction hinge assemblies, according to an example embodiment of the present invention. A support panel 302 is attached to a display panel 304 at a pivot point 306. The display panel 304 may include an opening 308 where a monitor, or other device configured to display or be displayed may protrude. The opening 308 may be provided in order to achieve a low profile for the protruding device. If opening 308 is not present, the device may be used with, for example, a flat screen monitor. Support panel 302 may

be attached to a fixed surface, or remain unattached for portability. Left linkage arm 310 and right linkage arm 312 may be pivotably attached to the plates as shown. Top pivots 314 and bottom pivots 316 may include, for example, pins and washers attached to connectors 318. Rivets may also be used to maintain constant friction, allowing for a rattle free pivot and economic manufacturing. The left linkage arm 310 and right linkage arm 312 may be attached anywhere along the support panel 302 and display panel 304.

[011] Due to the arrangements contemplated in the present invention, the friction hinges 320 in the linkage arms 310, 312 are not fixed at the pivot point 306. For example, the linkage arms 310, 312 may be connected at pivot points that are the same distance away from the pivot point, shown as distance D in Figure 3. Additionally, the linkage arms 310, 312 may be located a distance A away from each other.

[012] Friction hinges 320 are thereby disposed at a distance from the pivot point 306 between support panel 302 and display panel 304. The friction hinges 320 may be used to provide the torque necessary to maintain the position of the display panel 304 relative to the support panel 302. Greater stability and a ease of assembly is provided by the arrangement shown in Figure 3.

[013] This arrangement of the display tilt device shown in this example embodiment has the advantage that the height and angle of the display panel 304 may be adjusted with minimal effort. The design allows the display panel to be moved upward with little force and remain stable, requiring a comparatively much larger force to move the display panel downward. Therefore, once adjusted to a certain height, the display panel 304, as well as any object protruding from opening 308, are supported in a stable manner. Accordingly, the arrangement is configured to withstand motions such as small taps and minor forces without falling out of its current position, however, it may also be moved to a new position with ease.

[014] It will be appreciated that although two friction hinge assemblies are shown in the example display tilt mechanism of Figure 3, fewer or more friction hinge assemblies may be used as appropriate. One or more bidirectional friction hinges may be used. Furthermore, it is contemplated that other mechanisms capable of providing the necessary torque may be used in place of the friction hinge, such a detent hinge. In another exemplary embodiment, the left linkage arm 310 and right linkage arm 312 may be slideably coupled to tracks located on the support panel 302 and the display panel 304 such that the distance between the friction hinge and the main pivot increases as the angle between the display panel 304 and the support panel 302 increases. The tracks may include detents at various intervals in order to provide additional stability.

[015] Figure 4 illustrates an example lottery ticket terminal, according to an example embodiment of the present invention. Figure 4 shows a touch screen monitor ("touch screen") 401 attached to a base 405 by a display tilt mechanism including two friction hinge assemblies, arranged as in Fig. 3. The display tilt mechanism is not visible in this view, however portions of it are shown in Figure 5. The touch screen 401 may be, for example, an CRT monitor equipped with a touchscreen or an LCD touch screen monitor. Base 405 may house electronic components such as a processor, memory drives, disk drives, printer, software capabilities, and external device connectors needed to run the lottery game.

[016] Figure 5 illustrates the example lottery ticket terminal of Figure 4, with the monitor in a raised position, according to an example embodiment of the present invention. The support panel 410 is shown attached to the base 405 of the lottery terminal. A friction hinge 407 and linkages are shown and another friction hinge and linkages are hidden by the touch screen 401. The display panel 412 is attached to the back of the touch screen 401.

[017] The example lottery ticket terminal shown in Figures 4 and 5 has the advantage that the touch screen position may be adjusted by pulling or pushing on the

touch screen frame. This may be intuitive to the user and therefore, the terminal is simple to adjust. Also, it is possible to accommodate users of varying heights and varying light/glare conditions by repositioning the touch screen.

[018] Furthermore, within the range of motion, there are no restrictions of where the position of the touch screen may be held. Therefore, the touchscreen may be capable of maintaining any position within, for example, a 30 degree or 45 degree range of motion. Accordingly, an infinite range of angle adjustments are possible within the allowed range of motion. In addition, detents or similar devices may be included in order to add extra stability to the monitor in certain selected positions.

[019] Furthermore, the example lottery ticket terminal shown in Figures 4 and 5 has the advantage that it is not difficult to assemble and repair. Because the monitor and the display tilt mechanism may be assembled separately, they may disassembled and repaired or replaced separately. This modularity of design allows for replacement or repair of only what is minimally necessary to keep the lottery terminal operating.

[020] Furthermore, the touch screen of the example lottery ticket terminal is held in stable manner. The touch screen will not flex, spring, or bounce when pressed to select a touch screen button. Additionally, when excessive force is applied, the touch screen simply lowers into the most downward position. Since stops or detents are not necessary for stability, the possibility of broken stops or detents due to excessive force may be eliminated.